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A Knowledgebase Model for Islamic Inheritance

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Abstract
The dotcom generation has dramatically amplified the pitch of information gathering as well as dissemination. However, not all areas are experiencing the same breeze of efficacy. For instance, in this thesis we looked at the section of Inheritance distribution among the heirs.Seeking an expert opinion on inheritance is as common and natural as death itself. The law is set by human beings who use a broad range of skills and experience to make it fair, justified and acceptable to the people it governs. Nevertheless, the future is unknown to all of us and as times change so do situations, hence the law setters update the law by adding or subtracting articles according to the direction of wave. Even so, some level of biasness is usually inevitable especially when a quick and serious decision has to be made. To err is human, plays a major role here. In case of inheritance, people will initially turn to references and citations which may be inconclusive. This then calls for rationality, something that is more often accompanied by mood changes and influences which eventually deter the authenticity of a sound verdict.
Keywords : Neural Networks, knowledge Acquisition, Islamic Inheritance

1. Introduction

The desire to exercise control beyond the grave is deeply rooted in the human psyche. Before we die, we try to create cues that preserve our identity in the minds of the survivors. The survivor is left with images, materials, and wishes of the deceased that allow, or force, them to act on upon information and behaviours that were part of the deceased when he or she was alive. (Schafer, 2010)
Improper Information, inappropriate documentation, verdict delays, inefficiency and ineffectiveness, of the current system has lead to the following problems;

- A will may contain errors that only a probate court can rectify. Children may be unknown or mistakenly overlooked; property may be inaccurately estimated; the person making the will may mistakenly believe that something has happened when it hasn't. Each mistake must be individually considered and a court case must be brought to ask the probate court to correct the mistake or formally declare that an uncorrectable mistake makes the will or part of it invalid.
- Sometimes, a person maybe strongly influenced or deceived while drafting a will. If this affects "who inherits what," the probate court can be asked to declare the will, or part of it, void. This complicated legal proceeding can be worth pursuing if there is a substantial asset at stake.
- It is not always clear who qualifies to inherit what under a will, especially one prepared without an attorney. However, if the will uses non-technical terms such as "my friends" or "my relatives" a court case must be filed to determine who can inherit.
- If the person who died has left more than one will, or has made corrections or amendments ("codicils") to the will, the court may have to decide in legal proceedings which will documents to use.
- Separate eviction proceedings may be needed when the inherited property is being occupied. This person may be a caretaker, a tenant, a relative or a friend that the deceased had allowed to live on the property. Caution must be taken to avoid wrongfully evicting someone who has a competing legal right to the property – for example, a rent-to-own tenant.
- Delay in court proceeding has become a major issue all over the world. Innocent lives have been lost, under utilization of resources or properties taken by wrong hands. .

The world's Muslim population is expected to increase by about 35% in the next 20 years, rising from 1.6 billion in 2010 to 2.2 billion by 2030, according to new population projections by the Pew Research Center's Forum on Religion & Public Life. Africa was the second continent that Islam spread into after Asia, which explains the relatively high percentage and number of Muslims in this continent. In addition, the total population of Africa is 1.02 billion, of which about 446 million are Muslim. Thus, 27% of the World Muslim population resides in this continent. The population of Kenya is 30 (thirty) million of which the Muslims constitute thirty percent. This translates to 10 million (ten) Muslims. The Muslims are guided by the Holy Quran thus no argument about that.
Islamic inheritance distribution has been designated to specific people (Kadhi), so the Islamic religion has its rules in mind, which originate from the Quran and The Prophet's Saying (Peace Be Upon Him).

According to the Kenya Constitution; Chapter IV: The Judicature talks about the Kadhi's Court, which handles

two main issues pertaining to the Islamic Law. One of the issues is Islamic inheritance and the second is marriage. The Islamic law saves on economy, massacre and peacemaking to the Muslim Community in Kenya and the world at large.
Succession or inheritance may be defined as "the devolution of title to property under the law of descent and distribution". Succession would exclude those who take by deed, grant or any form of purchase contract.

2. The knowledge-based application system

2.1. Introduction

Of all the economic set of laws in the Quran, the most detailed are those on inheritance. The Quran restricts the individual's testamentary privileges to one-third of his or her estate. The Quran reserves the unbequeathed portion to children, spouses, parents, and siblings of both sexes, according to rules dependent on the exact composition of the legally recognized heirs. The rules were understood to provide shares also to more distant relatives under certain circumstances. (Sait,Siraj, Asa 2010)

2.2. Neural Network

The simplest definition of a neural network, more properly referred to as an 'artificial' neural network (ANN), is provided by the inventor of one of the first neurocomputers, Dr. Robert Hecht-Nielsen. He defines a neural network as:

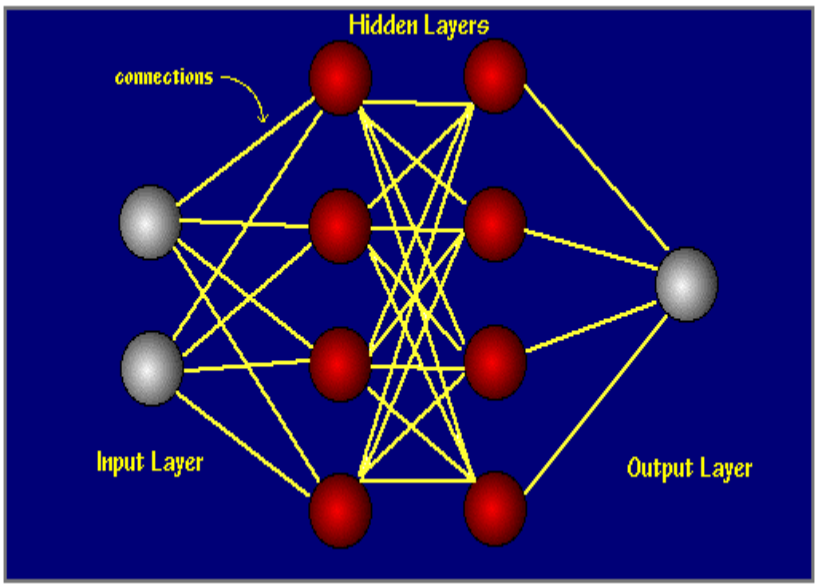
"...a computing system made up of a number of simple, highly interconnected processing elements, which process information by their dynamic state response to external inputs.

In "Neural Network Primer: Part I" by Maureen Caudill, AI Expert, Feb. 1989

ANNs are processing devices (algorithms or actual hardware) that are loosely model after the neuronal structure of the mammalian cerebral cortex but on much smaller scales. A large ANN might have hundreds or thousands of processor units, whereas a mammalian brain has billions of neurons with a corresponding increase in magnitude of their overall interaction and emergent behavior. Although ANN researchers are generally not concerned with whether their networks accurately resemble biological systems, some have. For example, researchers have accurately simulated the function of the retina and model the eye rather well.

2.2.1. The basic of neural Networks

Neural networks are typically organized in layers. Layers are made up of a number of interconnected 'nodes' which contain an 'activation function'. Patterns are presented to the network via the 'input layer', which communicates to one or more 'hidden layers' where the actual processing is done via a system of weighted 'connections'. The hidden layers then link to an 'output layer' where the answer is output as shown in the graphic below.



2.2.2. The Learning process

Learning is essential to most of these neural network architectures and hence the choice of a learning algorithm is a central issue in network development. What is really meant by saying that a processing element learns? Learning implies that a processing unit is capable of changing its input/output behavior as a result of changes in

the environment. Since the activation rule is usually fixed when the network is constructed and since the input/output vector cannot be changed, to change the input/output behavior the weights corresponding to that input vector need to be adjusted. A method is thus needed by which, at least during a training stage, weights can be modified in response to the input/output process. A number of such learning rules are available for neural network models. In a neural network, learning can be supervised, in which the network is provided with the correct answer for the output during training, or unsupervised, in which no external teacher is present. (Russell, 1997)

There are many types of Neural Network Learning Rules; they fall into two broad categories: supervised learning, and unsupervised learning.

Supervised Learning**:** The learning rule is provided with a set of examples (the training set) of proper network behavior: {x1, d1} , {x2, d2} , …, {xn, dn} … (1) where (xn) is an input to the network, (dn) is the corresponding correct target (desired) output. As the inputs are applied to the network, the network outputs are compared with the targets. The learning rule is then used to adjust the weights and the biases of the network in order to move the network outputs closer to the targets (desired).

Unsupervised Learning: In unsupervised learning, the weights and biases are modified in response to network input only. There are no target outputs available. At first glance this might seem to be impractical. How can you train a network if you don't know what is supposed to do? Most of these algorithms perform some kind of clustering operation. They learn to categorize the input patterns into a finite number of classes. This is useful in such applications such as vector quantization.

2.3. Islamic law of inheritance

The laws of inheritance have their source in the Qur'an and are derived from the interpretation of various schools of jurisprudence of the Qur'anic verses that relate to inheritance. Using the information in the Qur'anic verses, together with the traditions of the Prophet Muhammad, as well as methods of juristic reasoning, Muslim jurists have fleshed out the laws of inheritance in such detail that many works have been produced on the subject.
Islam is guided by the Holy Quran. Islamic Inheritance Laws and Systems consider how Muslim societies generally derived their inheritance rules from religious sources for the division of an individual's property upon death. The Quran contains about 35 Verses referring to succession and these are known as Ayat Al-Mawarith. At least seven Verses refer directly to testamentary disposition (2:180 – 182, 2:240, 4:33, 5:106 – 107). There are only three Verses (4:11, 4:12 and 4:176) which give specific details of inheritance shares. (Hussain, Abid 2005).

2.4. Knowledge Acquisitions

Knowledge acquisition is the process by which problem-solving expertise is obtained from some knowledge source, usually a domain expert. This knowledge can then be implemented into an expert system program that can provide expert assistance to non-experts when and where a human expert is not available. Traditionally knowledge acquisition is accomplished through a series of long and intensive interviews between a knowledge engineer, who is a computer specialist, and a domain expert, who has superior knowledge in the domain of interest. The difficulty, time, and cost of manual knowledge acquisition, however, have stimulated research in developing machine learning approaches that autonomously acquire knowledge from data sources without the assistance of humans. (Magdi 2007)

The knowledge acquisition method is classified into three categories: manual, combined manual and automated, and automated methods. Manual methods discussed include interviews, task-based methods, and expert self-elicitation. Combined manual and automated methods discussed include expert-driven and knowledge engineer-driven approaches. Automated methods presented include learning by induction, neural networks, genetic algorithms, and analogical and case-based reasoning. (Magdi 2007)

2.4.1. Knowledge acquisition approaches.

According to Bruce G. Buchanan the following are different approaches of Knowledge acquisitions;

- Learning from Examples; Induction can be an important method of acquiring new knowledge when libraries of previously solved cases already exist. Because such learning is itself a knowledge-based activity, knowledge about how to learn from examples can be expressed in much the same way as other problem-solving knowledge.
- Learning by Analogy; Analogical reasoning is not only a powerful problem-solving method but also an important method for constructing knowledge bases. Once one knowledge base is built and refined for an expert system, it should be able to use it as a stepping stone for building other, analogous knowledge

bases. There are two main topics to explore: finding appropriate analogies and using those analogies appropriately.

- Learning by Watching; Learning by watching is a form of learning from examples. The learning program is, in effect, an apprentice, watching the problem-solving behavior of a specialist,
- Learning by Chunking; this represents a different approach to knowledge acquisition than the others described here. Often in the process of solving a problem, a way is found of combining several steps into a single operation, or "chunk," thus improving performance and efficiency. A chunk can be represented as a rule that identifies which aspects of the task were useful in reaching the desired goal.
- Learning by Discovery; the program begins with an initial set of basic concepts about a subject area, elementary set theory, and explores the space of new concepts that can be conjectured on the basis of the old ones. Its exploration is guided by numerous heuristics that define the "interestingness" of new concepts formed in various ways from old ones.
- Learning from Written Text; this is an important source of knowledge is published articles. It interacts with an informed (though non expert) reader, thus postponing problems of a program's understanding unconstrained English.

3. DATABASE

A neuron is considered to be an adaptive element. Its weights are modifiable depending on the input signal it receives, its output value, and the associated teacher response. In some cases the teacher signal is not available and no error information can be used, thus a neuron will modify its weights, based only on the input and / or output. (Zurada, 1992)

This section will cover single neuron and single layer network, supervised learning and simple cases of unsupervised learning. The form of neuron activation function may be different when a different learning rule is considered. The trained network studies the weight vector (wi) or its component (wij), which connecting the (j'th) input with neuron (i). The output of another neurons can be the (j'th) input to the neuron (i).

The database will capture details as follows:-
According to Qur'an verse (4:12) In that which your WIVES leave, your share is a HALF(1/2) if they have NO CHILD; But if they leave a CHILD you get a FOURTH(1/4) of that which they leave after payment of legacies that they may have bequeathed or debts. In that which YOU leave, their (YOUR WIVES) share is a FOURTH(1/4) if you have NO CHILD; But if you leave a CHILD they get an EIGHTH(1/8) of that which you leave after payment of legacies that you may have bequeathed or debts. If the MAN or WOMAN whose inheritance is in question has left NEITHER ASCENDANTS NOR DESCENDANTS (Al-Khalala), but has left a BROTHER or a SISTER, EACH ONE of the two gets a SIXTH(1/6); but if MORE THAN TWO, they share in a THIRD(1/3); after payment of legacies he (or she) may have bequeathed or debts, so that no loss is caused (to anyone). THIS IS A COMMANDMENT FROM ALLAH; and Allah is Ever All- Knowing, Most-Forbearing.

According to Qur'an Verse (4:176), they ask you for a legal verdict, Say, "Allah directs (thus) about Al- Khalala (those who leave neither ascendants nor descendants as heirs). If it is a MAN that dies, leaving A SISTER but NO CHILD, SHE shall have HALF the inheritance. If (such a deceased was) a woman, who left NO CHILD, her BROTHER takes her INHERITANCE. If there are TWO SISTERS, they shall have TWO-THIRDS of the inheritance; If there are BROTHERS and SISTERS, the male will have TWICE the share of the female.(Thus) does Allah make clear to you (His Law) lest you go astray. And Allah is the All-Knower of everything.

3.1. Distribution Strategy

The analyzed distribution of the shares among the heir as follows;-

A. Primary (immediate) heirs
   The primary (or immediate) heirs are:-
   i. The spouse (husband or a maximum of four wives)
   ii. The children (sons and daughters)
   iii. The parents (father & mother)
   iv. The grandchildren (sons's son or son's daughter only) (applicable only when the son is already deceased only and has offspring)

B. Secondary heirs
   The secondary heirs are:-
   i. The grandparents (paternal and maternal)
   ii. The brothers and/or sisters (in the absence of father and son only)
   iii. The uncles and/or aunts (in the absence of grandparents only)

iv. The nephews and/or NIECES (In the absence of Brothers and sisters only)

3.2. Standard heirs

The flow chart below illustrates the standard heirs and the link between one heir to the other.

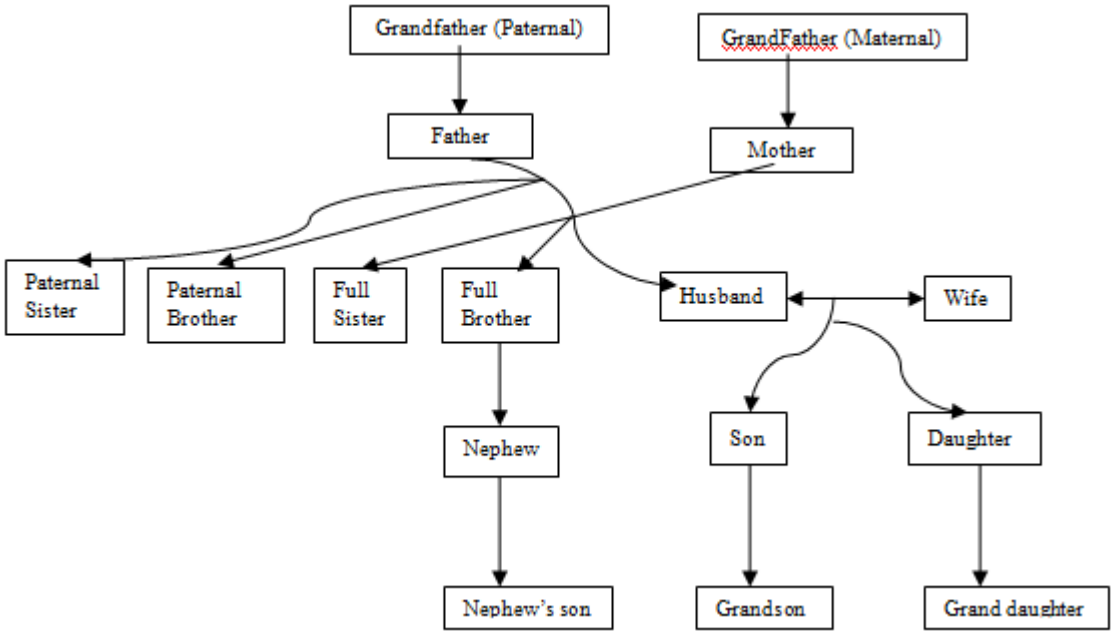


Figure 3.2: Standard heirs

3.3. Blocking rules

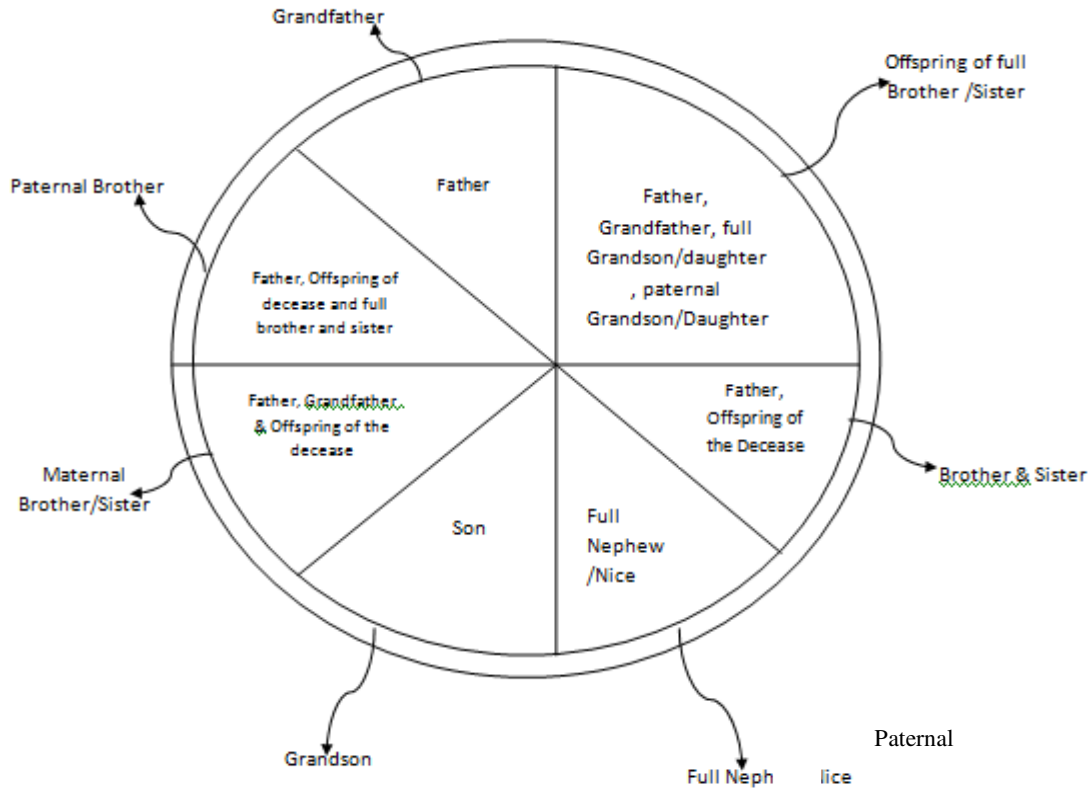


Figure 3.3.1

Description

The figure 3.3.1illustrates;-

i. Father blocks Paternal Grandfather.
ii. Father, offspring of decease and full brother and sister blocks Paternal Brother.
iii. Father, Grandfather and Offspring of the decease blocks Maternal Brother/Sister.
iv. Son blocks Paternal Grandson.
v. Full Nephew/Nice blocks Paternal Nephew/Nice.
vi. Father, Offspring of the Decease blocks Brother and Sister.
vii. Father, Grandfather, Full Grandson/daughter, Paternal Grandson/Daughter blocks Offspring of Full brother, Full sister

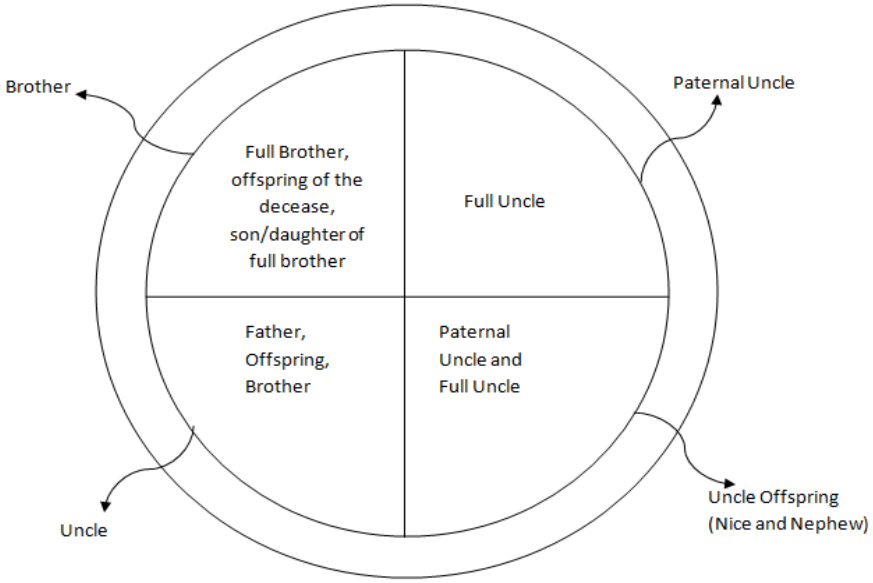


Figure 3.3.2

Description
Figure 3.3.2 illustrates:-

i. Full Brother, Offspring of the decease, son/daughter of full brother blocks paternal /Maternal Brother
ii. Father, Offspring, Brother blocks Uncle
iii. Paternal Uncle and Full Uncle blocks uncle Offspring (Nice and Nephew) Full Uncle blocks Paternal Uncle

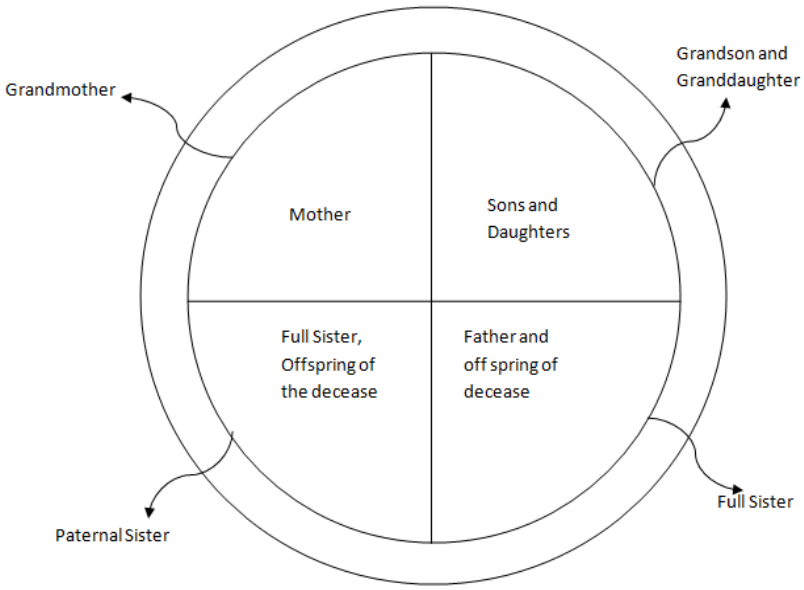


Figure 3.3.3

Description
Figure 3.3.3 illustrates;-

i. Mother blocks Grandmother
ii. Full Sister, Offspring of the Decease blocks paternal sister
iii. Father and off spring of the decease block full sister
iv. Sons and Daughters' blocks grandsons and granddaughters

4. Conclusion

Lack of prejudice is an empty promise if a person or group is deprived of attainable and equivalent access to the courts. Economic, racial, social and cultural barriers to the court unfortunately still exist. In our increasingly multifaceted society the rising expense of proceedings and the rising penalty for criminal behavior entails that we find constructive ways through which every individual, regardless of their life and economic circumstances, is able to have their day in court. When an individual's or a segment of society's ability to utilize the court is impaired, their alienation and exclusion adversely affect society as a whole.

Justice should be inseparable from fairness. Studies report a perception of unfairness in the court system. Each jurist and the court as a whole must remain vigilant that fairness is the court's hallmark and is so perceived by the individuals and the community it serves. To address this issues the court must reinforce policies and procedures designed to assure equal treatment of the strong and the weak, powerful and powerless, privileged and disadvantaged, majority and minority, which lead to the development of this system.

The Artificial Intelligence system is the desired Application for this paper.

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