SUDDEN CARDIAC ARREST (SCA) PREDICTION SYSTEM USING HEART RATE VARIABILITY (HRV) FEATURES AND MACHINE LEARNING ALGORITHMS

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PRODUCT DESCRIPTION
- This product is a composition of software (SCA prediction algorithm) and hardware (ECG data acquisition device)
- SCA prediction 5 minutes before its occurrence is realized by utilizing one minute of Heart Rate Variability (HRV) signal from green region as shown in Figure 1.

COMMERCIAL POTENTIAL
- Health care development - Hospitals/Chickens/Diagnostic centers
- Noninvasive - Remote health monitoring system development
- Highly useful for physicians/internist/dentist to have clearer monitoring of cardiac risk patients
- Prediction of SCA risks of hospital in-patients

NOVELTIES
- Simple and efficient preprocessing algorithm development
- Detecting SCA before Five (5) minutes of SCA onset
- Uses lesser feature (3) to produce higher SCA prediction rate
- Cost-effective 3 lead ECG QRS system
- An interactive graphical user interface and user-friendly system

Experimental Results:

Table 1: Results of Sudden Cardiac Arrest (SCA) Prediction Algorithm

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<thead>
<tr>
<th>Algorithm</th>
<th>Diagonal</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>Average</th>
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</thead>
<tbody>
<tr>
<td>Fuzzy Subtractive Clustering (FSC)</td>
<td>5.17</td>
<td>4.52</td>
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<td>Neuro-Fuzzy Classifier (NFC)</td>
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<td>Support Vector Machine (SVM)</td>
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PROBLEM STATEMENT
Numerous lives can be saved if SCA can be predicted 5 minutes before the onset as it gives medical personnel some valuable time to prepare the necessities to administer the treatment.

CONTACT DETAILS

GEO-CLAY BRICK: GREEN UNFIR ED CLAY G EOPOL YMER HIGH STRENGTH BRICK

PRODUCT DESCRIPTION
The infrastructure such as buildings for housing, industry and the facilities for handling water and sewage will require large amounts of construction materials. Since the large demand has been placed on building material industry especially in the last decade owing to the increasing population, there is a mismatch between demand-supply management of these materials. In 2010, based on International Trade Centre statistics, it is reported that Malaysia has imported over 453,904 million USD of construction materials from Product: Refractory bricks, bricks, blocks & refractory ceramic construction materials. Therefore, there is a need for Malaysians to be able to produce an efficient and green building materials especially bricks to fulfill our internal demand.

PROBLEM STATEMENT
Clay brick is one of the most important materials for construction industry. The basic advantages of the clay brick are good aesthetic appeal (natural red color), high thermal & acoustic insulation, zero maintenance cost, except for fire resistance and flexible in application. Clay bricks manufacturing process start with raw materials preparation, bricks making, cleaning, setting & drying process and followed by firing in kiln at high temperature before packaging. The main problem in the manufacturing process is the firing challenges. Refractory bricks are exposed to high temperature, high pressure and takes 7~10 days. Hence, it is ideal to solve major problems with bricks. Furthermore, the clay bricks production industry is a major source of air pollution in developing countries. It estimated that the brick industry produces 29% of the CO2 emissions for the construction sector. Therefore, UNFIR ED BRICKS appear to be an optimal solution for this problem. Published data on unfired clay brick shows variation of techniques has been applied to produce similar quality/properties exploited by commercialized fired clay bricks; nevertheless none of them were 100% successful.

On the other hand, geopolymization is a widely known method to produce a green geopolymer. Geopolymer can exhibit a variety of characteristics including high compressive strength, crack resistance, fire resistance, low thermal conductivity. Despite having all the advantages, an unfired clay brick using this technique is not yet well discovered.

NOVELTY/INVENTION
A novel unfired clay brick using top soil as raw materials is specifically designed to replace commercial fired clay brick as construction material to preserve our environment. Geo-Clay Brick is formulated using geopolymization process provides high compressive strength and possesses the same advantages as the commercialized fired clay bricks which is not found elsewhere.

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