**Graduation Project Proposal**

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| **Project Information** | | |
| **Project Title** | **Department/Faculty/University** | **Project Field/Discipline** |
| Vehicle Emergencies | Communication and Information Technology/ Engineering/ Helwan university | ICT for Transportation  Embedded Linux- Web Application Development- AWS Cloud |
| **Advisors’ Names** | **Advisors’ Mobile Numbers** | **Advisors’ Email Addresses** |
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| **Students’ Names** | **Students’ Mobile Numbers** | **Students’ Email Addresses** |
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**Is this project part of a mega-project at the same institution? Yes No (**If yes, please submit all proposals together.)

**If the project is sponsored by or initiated by an ICT company, please state its name**:

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| **Motivation** | | | | | | |
| **Please write why you chose this project idea, explaining clearly the problem that the project is addressing** | | | | | | |
| **As many vehicles are subjected to many kind of emergencies everyday like accidents, car breaking down for any reason, they may lack the ability to communicate and ask for help in critical situations, this project aims to implement a system that can receive the vehicle emergency correctly and take action depending on the type of emergency faced.**  **In modern life, as we are spending a lot of time in cars, it is important that we are protected against all odds , one of the smartest standards of safety that we can implement is the Emergency Calls, which are signals that are initiated from the vehicle Telematics Control Unit (TCU), that are used to specify the type of emergency of the driver is facing.**  **The system is built to give an automated assistance, when the emergency is generated the emergency enters a filtration unit , which specifies the kind of emergencies, whether it is an emergency is due to an accident or a breakdown, and directs the driver’s and car information to a specific destination which will be able to help ( ambulance car, an answering point ).**  **The Emergency call function gets automatically activated if the airbags of the vehicle are deployed. The Breakdown call function is generated when the TCU catches a type of malfunctioning of parts of the car it is monitoring.** | | | | | | |
| **Why do you think your project should be funded? for which the applicants write in a few lines where the help statement should be “Explain in no more than 3 lines the new and innovative aspects in your project that make it worthy of funding.”** | | | | | | |
| **The idea proposed in this project is an idea that brings in valuable and necessary features to our day to day modern life, yet for it to be well implemented efficiently it needs to have specific provided elements so that it can carry out its function well.**  **such system can carry out the emergency responses scenarios in various different ways, yet the most efficient, realistic and cost effective ways are the ones that would rather be implemented and looked into in our project.**  **The current needed hardware and services are not primitive and not low in price, for that we need the funding as to be able to establish and test and qualify our prototype in order to have one which can be turned into a product in the future.** | | | | | | |
| **Block Diagram:** | | | | | | |
| **Please insert the project detailed block diagram below, (Please highlight the parts that will be implemented in different colors than the parts that will be purchased)** | | | | | | |
| **Kindly notice that the part marked by the *Yellow color are the parts of implementation and required hardware/Service to purchase***  **Notice That the Telematics control unit is not in our area of the project, only its its output (an SMS through the GSM module) will be simulated to be the initial input of our project** | | | | | | |
| **Prototype Description and Specifications** | | | | | | |
| **Please note that ITAC only funds projects that result in a prototype. Include a clear description of how the prototype will operate, explaining a scenario/use case of the operation. Also include the performance metrics you target in the prototype.** | | | | | | |
| The projects aims to help with 2 types of emergencies:   1. Serious accidents 2. Car breaking down (for any reason)   **Each type of these emergencies is going to be direction to the right conduct that can actually help whether it was the ambulance or help that be directed to the emergency**  The idea of the projects evolves around a central receiving unit, which will receive the emergency from the telematics control unit’s GSM (SMS will be sent), and upon receiving it will filter out the emergencies and will send each emergency to its right direction,   * If it is an accident, the direction will be an ambulance car, and then to the hospital that is to receive the patient(s) in ambulance car * **If the car broke down , the information will be directed toward a web application that will show the information of the car driver , his phone number (id of the emergency), his car number, his location, and what has caused the car to breakdown**   The **first input of the system** will the SMS coming from the TCU (Telematics Control Unit)  As the Aggregation and Filtration  **raspberry pi** receives it, it filters the type of emergency,   1. if it is a **breakdown-call (Bcall):**   **Then the SMS received will be directed to a Web Application hosted on AWS Cloud, that will be used by a dispatcher so that it can send a response SMS back to the mobile number of the driver that have had the breakdown emergency.**  **- The Data of the Emergency will be synchronized between the receiving unit (RaspberryPi) and The cloud Storage Service (S3 Bucket)**  When the Web-application is  **hosted on AWS CLOUD, it will be a much more realistic scenario and will provide multiple advantages like:**  **-Higher availability (servers have very rare probability of *completely* failing in the cloud)**  **-Higher security (through the accomplished infrastructure in the cloud)**  **- and most *importantly enables remote access***  - The web application , as any, consists of a front end and a backend that later communicate with each other using their APIs.  After the dispatcher provides the response through its web application , the response is saved in a **SQL database**( along with the other information of the emergency in one record the database as well), the response it fetched from the database and sent to the phone number of who is having the breakdown.  **- The fetching of SMS , its filtration (done with parsing) and the entry and exit the information from the database is done using the application layer that is developed using python on the central raspberry pi.**   1. If it is **an Emergency-call (Ecall):**   The Emergency details Will be saved on a **FireBase Table (Web-Hosted DataBase)**  The text of the Emergency will appear to the ambulance car on the HDMI (Attached to the RaspberryPi**)** in the car that has a specifically made GUI.  **- The Ambulance car can then transmit its own data to the Hospital Server so that the hospital can prepare for receiving the**  **emergency**  **Technical Specifications:**  The **Ambulance car Raspberrypi** will have a specially made image (operating system) that will be designed for its targeted embedded system to ensure the efficient operation of the used hardware resources. **( Embedded Linux using The Yocto Project Tool )**  The Web application will be implemented using Front end Creation tool **React** and the backend will be implemented using **Nodejs** , to ensure that the web application is interactive and dynamic (changes as the database changes the user’s interface). **(Web application Development)**  The Web application will be deployed using AWS cloud infrastructure and services, **Using the S3 Bucket service**  will ensure that the database present on the raspberry pi receiving the emergencies is synchronized with the database present on the server in the cloud. **( Infrastructure and services as code )**  **The SMS fetching/sending programs & The GUI for the Ambulance car –** The GUI (using QT) of the ambulance car , will be the application layers that will operate upon the integrated image(OS). **( Application layer Development)** | | | | | | |
| **Project Plan** | | | | | | |
| **Please define the approach and phases to deliver the intended project outcome.** | | | | | | |
| **The current implementation criteria is following the Agile methodologies, We do not finish implementing a subsystem after the other but we work incrementally on establishing the base wholistic system an initial step and then we add features incrementally and test the system** | | | | | | |
| **Prototype Prospects** | | | | | | |
| **List the Egyptian ICT companies that may be interested in the developed prototype and the end-users/customers (name the specific class of individuals, governmental agencies, ministries … etc. that will benefit from the prototype)** | | | | | | |
| **List of ICT Companies:**  **SwiftAct**  **Valeo**  **Siemens**  **Ejad**  **Potential End-Users/ Consumers:**  **Car Owners and Driver / Car Manufacturing companies** | | | | | | |
| **Project Budget** | | | | | | |
| **Item** | **Type (Hardware/ Software/ Other)** | **Part in the Block Diagram** | **Possible Provider/ Merchant** | **Specifications** | **Quantity** | **Price in EGP** |
| RaspberryPi | Development Board | GSM receiving  (Emergencies aggregation and filteration unit) -  Ambulance Car | RAM – El Gammal | Raspberry Pi 4 | 2 | 4,000 |
| GSM Module | Cellular Communication Module | Attached to the RaspberryPi | Future electronics | SIM800 | 1 | 150 |
| HDMI Screen 7 Inch | Screen for RaspberryPi | Attached To Ambulance car RaspberryPi | RAM – El Gammal | 7 Inch , Touch Screen | 1 | 3,000 |
| 1 Power Supply 5V 5A SMPS | Power Supply for GSM SIM800 and the Raspberry Pi | Attached to Emergencies aggregation and filteration unit | Ampere Electronics | 5V 5A SMPS | 1 | 175 |
| AWS Credit | Credit for using the AWS Services | Hosting the web interface | AWS |  | 8$ = | 250 |
| **Grand Total** | | | | | | 11,575 |