

**Final Year Project Showcase Batch-2017
Year 2021**

<p align="center">Department: Electrical Engineering Programme: Electrical Engineering</p>		
1	Project Idea	<p>Real Time Arc Flash Study of a Power System using Cloud-Database and Selection of Suitable PPE Equipment using Augmented Reality</p>
2	Process	<p>Proper PPE selection for the operation of a switchgear is a real time problem. This is not possible to predict the level of incident energy (level of severity) before performing any operation on switchgear because the status (ON/OFF) of the number of incoming lines on any bus can change in a day. This project provides a cloud-based mechanism to calculate the fault current by monitoring the status of the CB and hence incident energy on the mobile app at any given distance. This is also noted that level of severity changes with the operating distance. Cloud based functions will monitor the change in status of circuit breaker and perform the calculations regarding arcing current and fault clearing time. A special transmitter circuit is designed for sending the signal to the cloud. Mobile app, based on augmented reality and design on Unity 3D will provide the correct PPE corresponding to the incident energy at the switchgear. Different QR codes are assigned to different switchgear panels in a substation. Mobile app, will decode the QR code and provide the correct PPE.</p>
3	Outcome	<p>Real time calculations of incident energy and proper PPE selection as per NFPA standards</p>
4	Evidence (Theoretical Basis)	<p>Proposed idea has been implemented on a 6.3kV cement power plant. There are three gensets and 1 grid as a source and multiple outgoing feeders as load feeders. Incoming source CB status are monitored and sent to the cloud via a wi-fi based transmitter circuit and the level of incident energy and PPE levels are selected accordingly.</p>  <p align="center">Figure: Mobile view</p>



5	Competitive Advantage or Unique Selling Proposition (Cost Reduction, Process improvement, Attainment of any SDG (Sustainable Development Goal), increase of market share or capturing new market or having superior performance over a competitor. In summary, any striking aspect of the project that compels the industry to invest in FYP or purchase it. Some detailed description is required in terms of how, why when what. You can select one or more from the following dropdown and delete the rest of them). Please keep relevant options, delete the rest of them, and correct the sequence.	
a	Cost Reduction of Existing Product	Currently there is no product available in competition, this is an innovative idea with practical implications.
b	Process Improvement which Leads to Superior Product or Cost Reduction, Efficiency Improvement of the Whole Process (e.g. What is the issue is current process and what improvement you suggests)	Currently, the cost of database is quite high. Right now, we are using firebase-a private cloud based data storage and computing tool which is a quite expensive. In future, we can develop our own cloud. This will also help in case of a large substation having multiple switchgears.
c	Attainment of any SDG (e.g. How it is achieved and why it is necessary for the region)	<p>SDG 03: Good Health and Well Being This project will helps the industry for safety of their employees from hazardous situations in order to reduce the number of deaths and illnesses from dangerous situations due to arc flash scenario. In this way, this project will ensure healthy lives and promote well-being for all at all ages.</p> <p>SDG 09: Industry Innovation and Infrastructure, This project will build resilient infrastructure, promote sustainable industrialization and foster innovation due to it's inovative capability. It will also open new horizons of technology development, research and innovation.</p> <p>SDG 15: Life on Land The addition of new hardware to enhance the safety of the person will highly ensure the safety of human being. New addition of technology is digital in nature with minimum hardware, therefore the advancement is eco-friendly in nature. The potential hazards due to fire without this innvotaion will result in destruction of electrical equipment, animal safety and building destruction in addition to loss of humans.</p> <p>SDG 17: Partnerships for the Goals. Currently Siemens is involved in this project and there can be involvement of other industries in order to revitalize the partnership for sustainable development and to promote the development, transfer, dissemination and diffusion of environmentally sound technologies to the country on favourable terms, including on concessional and preferential terms, as mutually agreed.</p> <p><i>This is expected that the product will capture the new market and will have affordable prices.</i></p>
d	Expanding of Market share (e.g. how it expand and what is the problem with the current market)	This is an innvovative idea, not only for Pakistan but also for the whole world. We will target a patent of this work. The target market is power generating units, electrical substations in taransimion and distribution network and electrical industries where a circuit breaker is used.
e	Capture New Market (e.g. Niche market or unaddressed segment)	This project will create it's own market since it is a basic need of any industry in order to make sure health and safety of their employees.
f	Any Environmental Aspect (e.g. carbon reduction, energy-efficient, etc.)	This product is environment friendly. There is no carbon emission in the environment due to this product.
g	Any Other Aspect	None



6	Target Market (Industries, Groups, Individuals, Families, Students, etc) Please provide some detail about the end-user of the product, process, or service	The target market is power generating units, electrical substations in transmission and distribution network and electrical industries where the safety protocols are strictly followed and a small mistake may result in a death of a person or persons. This is also important that, the same idea can be implemented on any switchgear where a multiple incoming lines are there, e.g. solar, diesel gensets and the grid.
7	Team Members (Names & Roll No.)	Muhammad Ahmed Ashraf (EE-17229) Hafiz Atta ul Mustafa (EE-17232) Muhammad Faizan (EE-17222) Haider Ali (EE-17311)
8	Supervisor Name	Dr. Muhammad Mohsin Aman
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10	Pictures (If any)	 <p>Figure: GUI displaying values from Fire-Base Calculations</p>
11	Video (If any)	--