

**Proposal / Application for**

**Final Year Project**

**Computer & Information Systems Engineering Department**

**<Project Title>**

**<submitted by>**

**NED University of Engineering & Technology**

# Project Identification

* 1. **Reference Number** (for office use only)

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| **C** | **S** | **-** | **1** | **8** |  |  |

* 1. **Project Title**

# Software-defined Camera for Outdoor Surveillance Applications

* 1. **Project Internal Advisor**

|  |  |
| --- | --- |
| Name | Fakhra Aftab |
| Designation | Lecturer |

* 1. **Project Internal Co-Advisor**

|  |  |
| --- | --- |
| Name | Dr Majda Kazmi |
| Designation |  |

* 1. **Project External Advisor**

|  |  |  |
| --- | --- | --- |
| Name | Arshad | |
| Designation |  | |
| Organization |  | |
| Mobile # |  | Email |

# Student Team

|  |  |  |  |
| --- | --- | --- | --- |
| **S. No.** | **Roll No.** | **Name** | **Email** |
| 1. | CS-18133 | Soniya Shafi |  |
| 2. | CS-18118 | Misha Akram |  |
| 3. | CS-18123 | Iqra Irfan |  |
| ~~4.~~ | CS-18110 | Hoor Soomro |  |

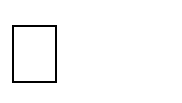
Please write down the name of group lead at S. No. 1

* 1. **Sponsoring Organization** (if any)
  2. **Keywords**

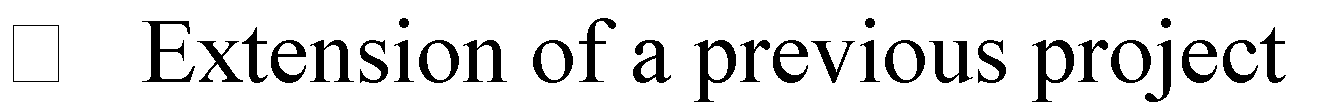
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* 1. **Project Idea**

Modification to a previous project



New



# ABSTRACT

Image processing applications are widely used nowadays which require a lot of processing which is a tedious task in order to tackle this problem a solution is devised which will adjust the parameters using environment profiling to capture such images that need little or no further pre-processing to generate accurate images.

# Project Background and Literature Review

(Detailed summary of what all has been done in the proposed area. Please note that this section demonstrates the depth of knowledge of the project team and builds the confidence of the evaluators about capability of the team in achieving the stated objectives. Please restrict your response to one page)

# Motivation and Need

All the computer vision algorithms that perform image analysis and processing require high quality images. The conventional cameras available now a days have fixed internal architecture i.e.; they are not programmable; hence not aware of their environment and non-adaptive. These cameras can’t provide a constant and standard image quality in different scenarios. All real time applications need to process data as fast as possible; the images need to be pre-processed as well before they can be used to generate useful results according to the requirements of an application. If the environment diverges from normal conditions or noise is generated, conventional cameras fail to maintain the standard image quality. As a result, more computational intensive & time consuming algorithms will be required to generate clean and clear images before using them in computer vision applications. This leads to the need for a software-defined camera; where imaging sensor inside camera is adaptive to respond environment. Therefore, processing the images directly on the camera, taking advantage of the sensors to become environmentally conscious. Such a camera takes over the load of preprocessing images. The strategy is to make our camera smart enough so that it can sense its surroundings and noise, adjusts its internal hardware and select most suitable parameters for the situation even before the image is captured. In this way, the quality of image will be constant. However, in a practical scenario, some of the images might be affected but there would not be in depth data loss hence data recovery will be possible.

# Objectives

# *• Studying and determining exact parameters which can be manipulated to produce high quality images.*

# *• Use of gathered data to profile the environment.*

# *• Integrating different models of the environment for an efficient solution.*

# *• Exploiting the internal architecture of the image sensor.*

# *• Develop image pre-processing IP cores and implement a solution that will integrate all the cores.*

# *• Test the software-defined camera for outdoor surveillance applications under various environmental conditions.*

# Methodology and Equipment/Tools

# Methodology

# The Xilinx Vivado High-Level Synthesis (HLS) tool will be used for the generation of multiple IP cores using software languages such as C, C++ and system C to handle the lack of the environment (fog, dust, humidity, low light, night etc.). This hardware-software co-design approach will accelerate the time needed to make new IPs and test them. The image sensor will be used to examine the lacking parameters of environment and adjust them accordingly by enabling IP cores before the capture of images.

# Equipment/Tools

# • FPGA Board (Zybo Z7-10/Zybo Z7-20)

# • Image Sensor (PCAM 5C)

# • Xilinx Vivado Design Suite

# • Xilinx Software Development Kit (SDK)

# • Xilinx Vivado High-Level Synthesis (HLS)

# *• Teraterm*

1. **Key Milestones and Deliverables**

(Please list and describe the principal milestones and associated deliverables of the project. A key milestone is reached when a significant phase in the project is concluded, e.g. selection and simulation of algorithms, completion of architectural design and design documents, commissioning of equipment, completion of test, etc. A deliverable is something concrete that you can submit to project supervisors once a milestone is achieved e.g. a code module, a chapter draft, etc. ) The timing of milestones is also to be shown in the Gantt chart in Section 11.

|  |  |  |  |
| --- | --- | --- | --- |
| **No.** | **Elapsed time (in months) from start of the project** | **Milestone** | **Deliverables** |
| 1. |  |  |  |
| 2. |  |  |  |
| 3. |  | , |  |
| 4. |  |  |  |
| 5. |  |  |  |

(Please add more rows if required.)

# Expected Outcome

1. **Direct Customers / Beneficiaries of the Project**

# Consent of Advisors

**Consent of the Internal Advisor** Signature:

**Consent of the Co-Internal Advisor** Signature:

**Consent of the External Advisor (if any)** Signature:

# Reviewers Committee’s Comments

1. **Project Schedule / Milestone Chart**

Project schedule using MS-Project (or similar tools) with all tasks, deliverables, milestones, clearly indicated.

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| --- | --- | --- |
| **13.** | **Project Approval Certificate** |  |
|  | **Recommendation of FYP Coordinator**  **Approval by the Chairman** | Signature:  Signature: |