Marcos

(Real-time mixed-reality interactive game)

ITSP Summer 2019, ITC, IIT Bombay

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# Team Details

TEAM ID:14

TEAM NAME: Enter the Dojo

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| --- | --- | --- | --- | --- |
| **Name** | **Roll Number** | **Year & Program** | **Email ID** | **Contact No.** |
| Auro Kumar Soni | 180260010 | First year,B.tech | aurokumar926@gmail.com | 9967405116 |
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Enlist subdivisions planned and key skill-sets of the team members involved. Add more rows if required.

|  |  |  |
| --- | --- | --- |
| **Name** | **Subdivision** | **Key Skill-set** |
| Auro Kumar Soni | Algorithms for position and orientation, AR implementation | Filtering techniques, Unity IDE, C# scripting, algorithm design |
| Devanshu | Coding and circuitry | Arduino, Datasheet analysis, Coding, C# |
| Anish Chaurasiya | 3D Mapping | 3D modeling, Unity3D |
| Chaitanya Kedia | AR implementation | AR Hardware |

# Discussion on Selected Problem

## Identification of problem

## Ideally, our problem is to first create a real time generative 3D map of the play environment and identify the various objects as penetrable or impenetrable via image processing. Simultaneously we wish to track the 3D position and orientation of an extended object (the gun; to determine bullet trajectory). Furter an AR program has to be created to create an illusion of actual fire when the gun is triggered. Finally it is to be determined whether the bullet would hit a player or not and if so then with how much impact.

## Explain the selected problem statement

Following the ideal statement would require state-of-the-art-tech and lot of time and resources.

So instead of creating a generative 3D map we would be creating a map of the environment manually and feed it into the central processor(a laptop in our case). Simultaneously we would deduce real time location and orientation of the gun to calculate bullet trajectory and when the trigger is pressed a function would be run to check whether the bullet hits another player or not.

Further an AR program is to be created which creates the illusion of an actual bullet shot.

## Why is it a good problem statement?

This is a game which requires a lot of agility, creativity, strategy and awareness. This game is non-addictive as it is played outdoors (it can be played indoors as well) and it can move the gamers who are glued to their seats. So this game is healthy both mentally and physically.

# Project details

Include everything that you have done till now. Includes images of the prototype and all the procedures you have followed.

## Estimating Orientation

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# Timeline

Please fill all the columns of proposed task to suggest your timeline for the whole project before review meet 1.

START OF PHASE 3

|  |  |  |  |
| --- | --- | --- | --- |
| **S.No.** | **Proposed task** | **Achieved task** | **Remark** |
| Meet 1 | 1. Deducing algorithms for calculating orientation and 3D position 2. Learning Unity 3D and C# 3. Clearing the Masterplan | 1. Orientation algorithm is finalised. For location a premade DRTLS would be used. 2. Learning unity3D and C# in progress 3. Masterplan cleared | We have to work on the interface of various modules such as Arduino and unity, DRTLS and unity. |
| Meet 2 | 1. Develop the DRTLS interface with Arduino or Unity. 2. Placing the DRTLS on a real place. 3. Get the required vector on unity and create the live game object. 4. Feed the 3D model in unity. |  |  |
| Meet 3 | 1. Develop the AR interface and the unity Remote interface. 2. Placing the AR viewer. |  |  |
| Final Review | 1. Fixing Bugs and packaging the game. 2. Analyse the practicality and further scope of the game. |  |  |

REVIEW MEET 1

|  |  |  |  |
| --- | --- | --- | --- |
| **S.No.** | **Proposed task** | **Achieved task** | **Remark** |
| 1 | Deducing algorithms for calculating orientation and 3D position | Orientation algorithm is finalised. For location a premade DRTLS would be used. | The noise covariances are yet to be determined.  [Orientation Algo](https://drive.google.com/open?id=1Ru6V1_mx5_sFMklJD1cuvqDvofQghcOW) |
| 2 | Learning Unity 3D and C#. | Learned Basics of Unity 3D and C# | “Accessing Object properties known that the position” is remaining |
| 3 | Clearing the Masterplan | Masterplan is cleared | [Masterplan](https://drive.google.com/open?id=10nRq2S0zZ5E25c7LGzp2_yLe-9JCuIcP) |

REVIEW MEET 2

|  |  |  |  |
| --- | --- | --- | --- |
| **S.No.** | **Proposed task** | **Achieved task** | **Remark** |
| 1 | Develop the DRTLS interface with Arduino or Unity. |  |  |
| 2 | Placing the DRTLS on a real place. |  |  |
| 3 | Get the required vector on unity and create the live game object. |  |  |
| 4 | Feed the 3D model in unity. |  |  |

REVIEW MEET 3

|  |  |  |  |
| --- | --- | --- | --- |
| **S.No.** | **Proposed task** | **Achieved task** | **Remark** |
| 1 | Develop the AR interface and the unity Remote interface. |  |  |
| 2 | Placing the AR viewer. |  |  |

FINAL PRESENTATION

|  |  |  |  |
| --- | --- | --- | --- |
| **S.No.** | **Proposed task** | **Achieved task** | **Remark** |
| 1 | Fixing Bugs and packaging the game |  |  |
| 2 | Analyse the practicality and further scope of the game. |  |  |

# Budget

Please make a list as follows. Add more columns as required. Provide a separate budget table for each phase as per the timeline.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Item & description** | **Justification** | **Purchase link** | **Cost** | **Quantity** |
| Arduino Mega | To provide an interface between body sensors, gun sensors and the unity API | [Amazon](https://www.amazon.in/gp/product/B07FMDSPMN/ref=ppx_yo_dt_b_asin_title_o00_s00?ie=UTF8&psc=1) | 880 | 1 |
| MPU9250 | To measure the orientation | [Amazon](https://www.amazon.in/gp/product/B077D3J9X3/ref=ppx_yo_dt_b_asin_title_o00_s01?ie=UTF8&psc=1) | 599 | 1 |
| DWM1001 | To track the position |  |  |  |
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# References and acknowledgements: