**What：**

3D/2D FDTD simulator with multi-user interaction and communication

**Who：**

The app aims at educators, students, researchers in companies, who have requirements on knowing how EM field is propagating through different shape of objects made by different materials.

**Why：**

1. Wave propagation visualization of the prediction by Maxwell Equation
2. Simulating the optics property of materials with complex shape and parameters
3. Simulation for design of antennas and chips(RF chip for cars, etc.), which is also related to EM waves.

**When：**

Users can use the app during:

1. study and teaching for students,
2. material research,
3. product research and development of antennas or RF chips,

and other similar products related to transmission of EM waves, and so on.

**Where：**

1.Unity can pack the app to work in Windows on normal PC, Android and iOS mobile phone.

2.It can also work in VR devices such as Oculus 2, Oculus 3, and other similar devices, if we pack the app correctly using correspond settings.

The VR interaction part can only be used with suitable VR devices.

**How：**

prerequisite knowledge: algorithom of FDTD, understanding of MW equations in discrete space and time, and also how EM field is affecting the material with optics parameters.

The 2D/3D FDTD algorithom need to be achieved in Unity using C#. Furthermore, bound condition and so on need to be considered.

In Addtion, interaction and communication between different users could also be achieved. For e.g., one user can point at some place of the field and chat with another person, collaboration can also be achieved for changing the shape or position of the materials together. The size of box-shaped space of FDTD could also be changed, and so on.

The result of trying to run the 2D FDTD github project in Microsoft Edge:

