





# 1 Augmented Reality UNIX C++ Engine for Enhanced 2 Visual Guidance in Woodworking

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## Software

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## 6 Summary

## 7 Statement of need

## 8 Functionalities

## 9 Layer-stack flow

10 The layer stack is primarily responsible for managing the flow control of the AR engine.  
11 Designed as a modular system, each layer encapsulates the code for a specific domain of the  
12 AR application, such as camera processing, object tracking, UI, and rendering. The general  
13 order and expansion of these layers can be configured in the top-level main file `ACApp.cpp`.

14 Each layer in the stack inherits from a superclass interface defined in `Layer.h`, which includes  
15 event-like methods triggered at various points during frame processing (e.g., `OnFrameAwake()`,  
16 `OnFrameStart()`, `OnFrameEnd()`). These methods are invoked by the main `Run()` function in the singleton  
17 application loop from `Application.h`. This design allows application tasks to be containerized  
18 and executed sequentially while facilitating data exchange between specific layers through the  
19 `AIAC_APP` macro, enabling the retrieval of any particular layer data. Exchange between layers can  
20 also take place in a more structured way with the integrated event system (`ApplicationEvent.h`),  
21 which is capable of queuing events from layers and trigger in the next main loop.



**Figure 1:** Illustration of the layer-stack design and the main loop for the AR engine.

22 **Geometry framework**

23 **Computed Feedback System**

24 **AR rendering**

25 **Acknowledgements**

26 **References**