

# Udit's Proposal:

$\mathcal{O}$  = set of players on offense  
 $\mathcal{D}$  = set of players on defense

## Expected Pass Points Added:

PASSES: set of all throws  $(l, t, T)$  where  $l = (x, y, z)$  targeted pass ending location  
 $t$  = moment qb throws ball  
 $T$  = time of flight of throw

$$EPPA(D) = \sum_{P \in \text{PASSES}} \underbrace{EPA(P | C_P, T_P, D)}_{\substack{\text{pass caught} \\ + \times \text{PAC}}} * \underbrace{P(C_P | T_P, D)}_{\substack{\text{completion} \\ \text{probability of throw}}} * \underbrace{P(T_P | l)}_{\substack{\text{probability} \\ \text{of throw } l \text{ that pass } P}}$$

Spearman built Normal dist based off hist. passes and crossed that with completion prob. We can use something super simple, Sonty's model, or Nick's model.

into, discrete integrate to build ASC zones.

$$t' = t + R$$

$$ASC(P_t, \vec{r}_t, t')$$

AirSpaceControl

$$\sum_{j \in \mathcal{O}} ASC_j(P_t, \vec{r}_t, t')$$

distribution that  $j$  makes a play on ball after reaching  $\vec{r}$  (lower for attack)

$$ASC_j(t, \vec{r}, T) = f_j(t, \vec{r}, T) \left( 1 - \sum_{k \in \mathcal{D}} ASC_k(t, \vec{r}, T) \right)$$

$\tau_{exp}(t, \vec{r}) = \# \text{ physics}$   
 $\tau_{true}(t, \vec{r})$  : reactions, instincts, awareness, etc.  
simple: feed  $\tau_{exp}$  through logistic dist. so  
 $> (T - \tau_{exp}) \rightarrow > \text{probability for } f_j$