Collaborative littering. Carol 013 Alice (0') Marie Dave Out (nominal ×(1) x (2) 0 7 0 0 5 0 1.0 over all usele who here

In the first algo,

if you have movie ratings,  $\pi^{(1)}, \dots, \pi^{(n_n)}$ then predict  $\theta^{(1)}, \dots, \theta^{(n_n)}$ In 2<sup>-d</sup>, if your users have  $0^{(1)}, \dots 0^{(n_n)}$ can cotinate  $\chi^{(0)}, \dots \chi^{(n_m)}$ E fectures for deferent So, we are putting both of them together as -J (2(1), .... x(nm), Q(1), ... P(nu)) = 1 > ((1) (1)) 7 (1) XCR now Ray ? 1) Pricialize  $x^{(1)}, \dots x^{(n_m)}, \theta^{(1)}, \dots \theta^{(n_u)}$  to grade mandom value. 2) Minimize  $J(x^{(1)}, ..., x^{(n_m)}, \theta^{(1)}, ..., \theta^{(n_m)})$  using gradient descent (or and advanced opt algorithm) Eg. for every J=1... Mu i=1,.... MM:

$$\eta_{k}^{(i)} := \eta_{k}^{(i)} - k \left( \sum_{j:\tau(i,j')=1} ((0^{(i')})^{\tau_{\chi(i')}} - y^{(i,j)}) O_{k}^{(i)} + \eta_{\chi_{k}^{(i)}} \right)$$

for a user with sparometers of & a movie with Learnest features , predict a stoor rating. OT n

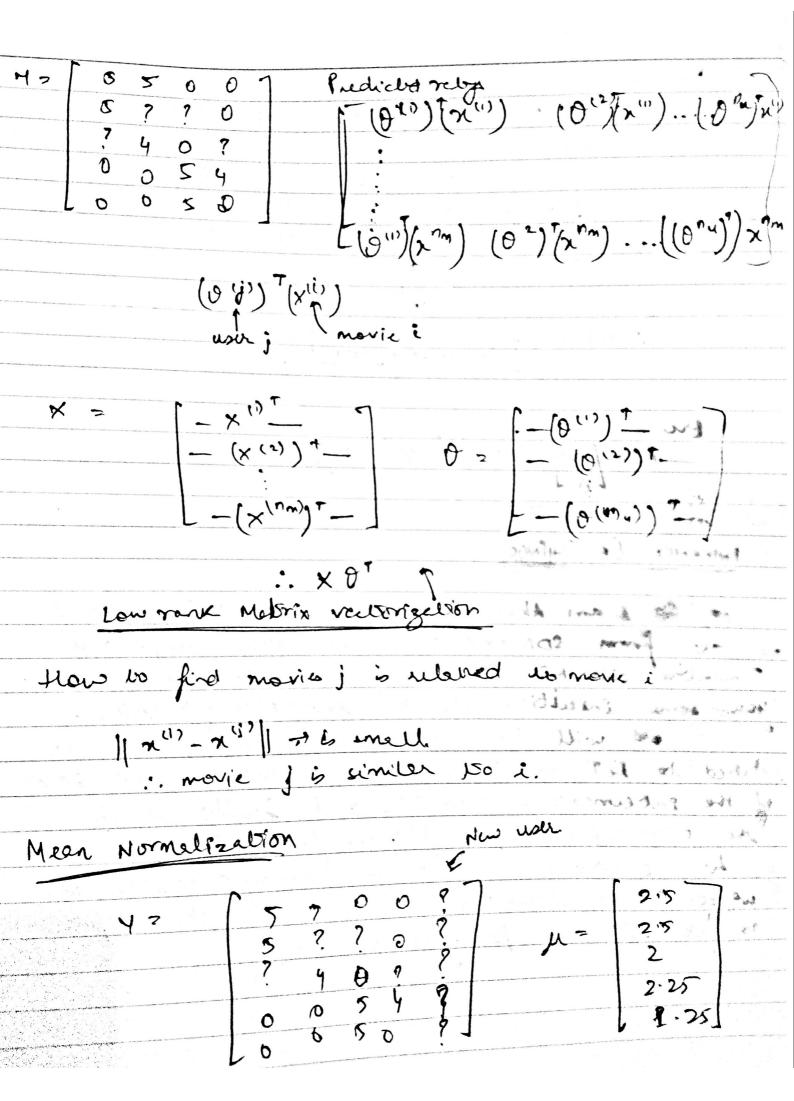
(OV) (N')

Vectorization Example

( Low rank metrix pactorize tron)

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**************************************			and the state of t	-	a reports to a file describe educated Spring Street Street	Y



$$Y = Y - \mu$$
 $Y = Y - \mu$ 
 $Y = \mu$ 

:. For usu j, on movie i predicts.  $-(0^{(j)})^T (x^{(l)}) + \mu_i$