The 2017 Beijing Workshop on Forecasting

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by

School of Statistics and Mathematics

Central University of Finance and Economics

Venue

(cademic . a'' ;Room to be announced via Email<
Centra' Universit# o) %inance and *conomics
39 Sout/ Co''ege Road+ . aidian District+ !000=! -ei>ing+ C/ina

Date

Saturday, November 18, 2 1!, 8"# $1!"#

In ite! "peakers

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#egistration

Ao registration)ee is c/arged)or a'' participants+ 3ut participants s/ou'd scan t/is BR code to register)or t/e 4orks/op 3e)ore November 1%, 2 1!&

Contact $s

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0'(00)12(00 *e+note ,ecture on Forecasting

S'ea(er" Ro3 .#ndman+ , onas/ Universit#

Rob J Hyndman *is Professor of Statistics in the Department of Econometrics and Business Statistics at Monash University. He is also Editor-in-Chief of the International Journal of Forecasting and a Director of the International Institute of Forecasters. Rob is the author of over 150 research papers and 5 books in statistical science. In 2007, he received the Moran medal from the Australian Academy of Science for his contributions to statistical research, especially in the area of statistical forecasting. For over 30 years, Rob has maintained an active consulting practice, assisting hundreds of companies and organizations around the world. He has won awards for his research, teaching, consulting and graduate supervision.*

Topic I(Forecast accurac+ an! e aluation

.o4 do 4e decide 4/ic/)orecasting met/od is t/e 3est)or our time seriesH &/ere /ave 3een severa' measures o))orecast accurac# proposed+ 4/ic/ 4i'' 3e discussed. I e 4i'' a'so 'ook at /o4 t/ese can 3e used to se'ect a)orecasting mode')or a given time series.

Topic II(-uto&atic ti&e series forecasting(.T"/ -#I0 -/ "T,0/TB-T"/ F-""T.#

, an# app'ications reCuire a 'arge num3er o) time series to 3e)orecast comp'ete'# automatica''#. %or e5amp'e+ manu)acturing companies o)ten reCuire 4eek'#)orecasts o) demand)or t/ousands o) products at do9ens o) 'ocations in order to p'an distri3ution and maintain suita3'e inventor# stocks. In t/ese circumstances+ it is not)easi3'e)or time series mode's to 3e deve'oped)or eac/ series 3# an e5perienced ana'#st. Instead+ an automatic)orecasting a'gorit/m is reCuired. I 4i'' descri3e some o) t/e 3est automatic)orecasting a'gorit/ms t/at are 4ide'# used in practice+ as 4e'' as a ne4 met/od t/at /as on'# 3een recent'# proposed. ('' o) t/e a'gorit/ms are imp'emented in R.

Topic III(1ierarchical forecasting

&ime series can o)ten 3e natura''# disaggregated in a /ierarc/ica' or grouped structure. %or e5amp'e+ a manu)acturing compan# can disaggregate tota' demand)or t/eir products 3# countr# o) sa'e+ retai' out'et+ product t#pe+ package si9e+ and so on. (s a resu't+ t/ere can 3e mi''ions o) individua' time series to)orecast at t/e most disaggregated 'eve'+ p'us additiona' series to)orecast at /ig/er 'eve's o) aggregation. (common constraint is t/at t/e disaggregated)orecasts need to add up to t/e)orecasts o) t/e aggregated data. &/is is kno4n as)orecast Jco/erenceK. I /en 4e turn inco/erent)orecasts into co/erent)orecasts+ 4e ca'' it J)orecast reconci'iationK. I 4i'' s/o4 t/at t/e optima' reconci'iation met/od invo'ves)itting a 'inear regression mode' 4/ere t/e design matri5 /as one co'umn)or eac/ o) t/e series at t/e most disaggregated 'eve'. -ut 4it/ /uge num3ers o) time series+ t/e mode' is impossi3'e to estimate using standard regression a'gorit/ms. I 4i'' s/o4 /o4 t/e /ts package)or R so'ves t/is pro3'em.

12(20)13(20 De&ographic an! .cono&ic Forecasting

12(20)14(10 Ba+esian !e&ographic esti&ation an! forecasting

S'ea(er: 2unni ?/ang+ Peking Universit#

)bstract: &/ere is a natura')it 3et4een -a#esian statistics and demograp/ic estimation and)orecasting. -a#esian met/ods can cope 4it/ comp'e5 mode's and nois# data+ 4/ic/ are common in demograp/ic estimation and)orecasting. -a#esian met/ods a'so provide ric/ measures o) uncertaint#. In t/e ta'k+ 4e 4i'' descri3e a 'ong term pro›ect to deve'op met/ods and so)t4are)or -a#esian demograp/#. &/e pro›ect emp/asises disaggregated estimates and)orecasts. Ie 4i'' give an overvie4 o) our)rame4ork+ and present some i''ustrative resu'ts.

14(10)14(30 5D "&art "uppl+ Chain Dri en b+ -I

S'ea(er: $ei Song+ Senior ,ac/ine $earning *ngineer+ 2D.com

)bstract: In 2D+ (I tec/no'ogies /ave 3een app'ied in man# areas o) our 3ussiness+)or instance S"U recommendation+ drones+ automatic 4are/ouses etc. In t/is ta'k+ I 4i'')ocus on anot/er important app'ication o) (I in 2D+ name'#+ supp'# c/ain management. I 4i'' s/o4 #ou /o4 4e 'everage (I tec/no'ogies to drive ever# process o) our smart supp'# c/ain+ 4/ic/ inc'udes demand)orecast+ automatic rep'enis/ment+ S"U a''ocation+ markdo4n etc.

14(30)13(20 Forecasting ti&e series 6ith co&ple7 seasonal patterns using singular spectru& anal+sis

S'ea(er: .ui -u+ -ei/ang Universit#

)bstract: &ime series)rom 3usiness and economics ma# /ave mu'tip'e seasona' components+ 4/ic/ ma# 3e di))icu't to identi)# 4/en mu'tip'e seasona' autoregressive integrated moving average ;(RI,(< mode's are 3ui't. &o so've t/is pro3'em+ 4e propose a speci)ication met/od)or mu'tip'e S(RI,(mode'+ ca''ed SS(S(RI,(procedure+ t/at dra4s on t/e advantages o) singu'ar spectrum ana'#sis ;SS(< and t/e -o5 2enkins standard procedure o) t/e seasona' (RI,(;S(RI,(< mode' to reduce t/e /uman in)'uence. &/is paper uti'i9es mont/'# passenger t/roug/put data o) t/e .ong "ong and San %rancisco airports to test t/e proposed SS(S(RI,(mode'ing met/od. Ie compare t/e out o) samp'e)orecasting per)ormance o) mu'tip'e S(RI,(mode')o''o4ing SS(S(RI,(procedure and t/e standard -o5 2enkins procedure+ SS(recurrent)orecasting met/od+ /#3rid mode' o) SS(and S(RI,(and /#3rid mode' o) 4ave'et and S(RI,(. &/e empirica' resu'ts s/o4 t/at dou3'e seasona' (RI,(mode's identi)ied 3# our met/od 3etter)it t/e data and improve t/eir out o) samp'e)orecasting per)ormance.

13(30)17(20 %robabilistic Forecasting

13(30)18(20 %robabilistic hierarchical forecasting

S'ea(er: Ro3 .#ndman+ ,onas/ Universit#

)bstract: %orecasting /ierarc/ica' time series /as 3een o) great interest in recent #ears. .o4ever+ t/e 'iterature /as main'#)ocused on o3taining point)orecasts t/at are co/erent across a /ierarc/#. Instead+ I 4i'')ocus on t/e pro3'em o) producing pro3a3i'istic)orecasts)or /ierarc/ica' time series. %irst+ 4e 4i'' 'ook at /o4 to de)ine co/erenc# in a pro3a3i'istic setting. &/en 4e 4i'' 'ook at some resu'ts)or pro3a3i'istic co/erence assuming Laussian)orecast densities. %ina''#+ 4e 4i'' re'a5 t/e Laussian assumption and propose a nove'+ non parametric approac/ to generate co/erent)orecasts. &/is entai's simu'ating)uture samp'e pat/s o) t/e 4/o'e /ierarc/# 3# incorporating 3ootstrapped in samp'e errors and reconci'ing t/ese so t/at t/e# 3ecome co/erent. I e eva'uate 3ot/ approac/es via e5tensive , onte Car'o simu'ations.

18(20)17(00 I&pro ing forecasting perfor&ance using co ariate) !epen!ent copula &o!els

S'ea(er: %eng $i+ Centra' Universit# o) %inance and *conomics

)bstract: Copu'as provide an attractive approac/)or constructing mu'tivariate distri3utions 4it/)'e5i3'e margina' distri3utions and di))erent)orms o) dependences. 8) particu'ar importance in man# areas is t/e possi3i'it# o) e5p'icit'#)orecasting t/e tai' dependences. , ost o) t/e avai'a3'e approac/es are on'# a3'e to estimate tai' dependences and corre'ations via nuisance parameters+ 3ut can neit/er 3e used)or interpretation+ nor)or)orecasting. (iming to improve copu'a)orecasting per)ormance+ 4e propose a genera' -a#esian approac/)or mode'ing and)orecasting tai' dependences and corre'ations as e5p'icit)unctions o) covariates. &/e proposed covariate dependent copu'a mode' a'so a''o4s)or -a#esian varia3'e se'ection among covariates)rom t/e margina' mode's as 4e'' as t/e copu'a densit#. &/e copu'as 4e stud# inc'ude 2oe C'a#ton copu'a+ C'a#ton copu'a+ Lum3e' copu'a and Student's t copu'a. Posterior in)erence is carried out using an e))icient , C , C simu'ation met/od. 8ur approac/ is app'ied to 3ot/ simu'ated data and t/e SNP !00 and SNP 700 stock indices. &/e)orecasting per)ormance o) t/e proposed approac/ is compared 4it/ ot/er mode'ing strategies 3ased on 'og predictive scores. Va'ue at Risk eva'uation is a'so pre)ormed)or mode' comparisons.

17(00)17(20 Forecasting using ti&e series feature spaces

S'ea(er: @an)ei "ang+ -ei/ang Universit#

)bstract: &/is paper investigates t/e diversit# o) t/e , 3 dataset used 3# most)orecasting researc/ers and s/o4s /o4 a time series dataset can 3e visua'i9ed+ 4it/ eac/ time series 3eing a point in a t4o dimensiona' space. (ccording to t/e Ao %ree $unc/ t/eorem+ t/ere is no one time series)orecasting met/od t/at 4i'' a'4a#s per)orm 3est. Liven t/at t/e statistica')eatures o) time series /ave an impact on t/eir)orecasting accuracies+ 4e aim to e5amine /o4 t/ose)eatures in)'uence)orecasting met/od per)ormances t/roug/ simu'ations)rom mi5ture autoregressive ;, (R< mode's+ 4/ic/ ena3'es us to predict t/e per)ormances o) t/e)orecasting met/ods on t/e , 3 data and se'ect t/e 3est)orecasting met/od. %ina''#+ 4e propose a ne4 met/od)or generating ne4 time series 4it/ contro''a3'e c/aracteristics 4it/ t/e aim o) enric/ing t/e diversit# o) t/e)eature space+ 4/ic/ provide potentia''# more insig/ts t/an t/e current space.